easydetect and easydetect deluxe
model train detector kits
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INSTRUCTIONS AND DIAGRAMS REVISED NOV 12TH 2018
Please note that the color of the calibration trimmer may be orange or blue
instead of the black pictured depending on what brand of trimmers are
available

Features, Set Up, Wiring Diagrams, Calibration, User Manual, and
Assembly Instructions

Thank you for purchasing our new detector circuit kit for model railroads.
This kit can be used to provide a visual indication at your control panel of trains in
hidden staging or it can also be used to turn on and off your crossing flashers at
grade crossings, AS WELL AS CONTROL YOUR SWITCH MACHINES, AND
CONTROL YOUR SIGNALS……

Features:

Least expensive train detector kit available

Easy To Assemble even for someone who has never built an electronic kit

Small Size so you can hide it virtually anywhere

Easy to install on your layout…only 2 small holes needed between the rails,
so it is almost invisible

Uses very little power – requires a 6 to 12 volt dc power supply, and uses only
10-20 milliamps

6 DIFFERENT VERSIONS
STANDARD
DELUXE
STANDARD WITH SPDT RELAY
DELUXE WITH SPDT RELAY
STANDARD WITH DPDT RELAY
DELUXE WITH DPDT RELAY
Before we go any further let’s discuss the various means of detecting a model train and their advantages versus disadvantages.

1. Current Detection. In a current detection scenario, your layout is divided into electrical blocks. When a locomotive enters that block it draws current that can be detected. This is how real railroads detect trains. Unfortunately to do this on a model railroad, more than just the first locomotive needs to draw current. This means you have to equip all or most of your cars with resistors or resistive paint between the wheels. For this reason we did not use current detection, because you would have to spend a bunch of money and time to modify all of your cars.

2. Optical Detection. This is the method our detector uses, in a very simple, inexpensive way. Our circuit uses 2 phototransistors (or 4 phototransistors in our Deluxe Kit) to detect the ambient light on your layout. When something—a loco or car covers at least one of the phototransistors, the detector circuit is activated. This is like an electronic switch that is turned on or off depending on whether it senses light or darkness. You can use our easydetect circuit to turn on a led at your control panel so you know where on your layout a train is located….useful in hidden staging yards, or to turn on and off a crossing flasher kit….like the one we sell. The disadvantage to our circuit is that there must be enough light on your layout (there is a calibration adjustment you can make to adjust for most lighting levels, more on this later…..) and if you are using it to turn on/off a crossing flasher, your train must be long enough that the 1st phototransistor will still be covered buy a car as your locomotive goes over the 2nd phototransistor. Of course there are other optical detectors that either use ambient light, or infrared emitter/detectors, but they are a lot more expensive….in some cases 3 times as much!

ASSEMBLING YOUR DETECTOR KIT

You will need the following tools and supplies to assemble and install your detector kit:

…..Small pencil size soldering iron with fine tip

…..Rosin core solder
…..some small diameter (24-30 gauge) wire to connect the phototransistors to the circuit board, wire to connect to your 6 – 12 volt DC power supply, and wires to connect to your load. Your load can be our crossing flasher kit, or an led mounted on your control panel

…..heat shrink tubing or electrical tape to insulate the leads of the phototransistors

…….drill to make holes between the rails of your model railroad track for the 2 phototransistors

Please look at the picture below to identify the parts, and where the parts go on the circuit board – note that the phototransistors look just like 3mm leds
1. make sure the board is laying face up so that the silver lines between the holes are laying face up as shown

start by placing the 2n3904 transistor thru the 3 holes in the circuit board and solder in place….please note the transistor has a rounded side and a flat side, so **make sure you install the transistor the right direction as it appears in the pictures – flat side facing out** – clip off the excess length of the transistor leads on the bottom of the board after soldering
3. place the board resistor (1k Ohm – brown – black – red – gold) as shown and solder in place. Note it does not matter which end of the resistor goes where. Clip off the excess length of the resistor leads on the bottom of the board after soldering.
4. place the calibration trimmer in the holes as shown and solder in place
5. place color coded wires in the holes to run to the phototransistors
Before installing the detector on your layout...we highly recommend that you test it on your workbench first

Apply 6-12 volts DC power to the power input wires on the kit as per the picture above

If the lights are fairly bright in your layout room the red led should light up when you cover either one of the two phototransistors with your finger.

If the red led does not light when you cover either one or both of the phototransistors, then while keeping at least one of the phototransistors covered, take a small screwdriver, and turn the calibration trimmer until the red led turns on...

start by turning the calibration trimmer a small ways to the right then cover either one or both of the phototransistors, again......by turning to either the left or right
you should find a spot where the status led turns on when you cover one of the phototransistors.

if you still can’t get it to work, try increasing the light in your layout room... maybe try a small clamp on lamp over one of the phototransistors... and try adjusting the calibration trimmer again... it should work.... Try holding the phototransistors in your hand and move them closer or farther away from your workbench lamp(s)

6. determine how far apart you want to place the phototransistors, and trim the wires to length
7. either slip some heat shrink tubing over the ends of the wire before soldering the wires to the phototransistors, or use electrical tape to insulate the legs of the phototransistors – make sure that the long leg of each phototransistor is soldered to the correct color coded wire that then goes to the correct hole on the circuit board

8. Drill holes between the rails where you want your phototransistors to detect the train and insert the phototransistors in the holes so the rounded tops are facing upwards
9. solder color coded wires in the holes as shown for power to the kit and power to control your load – follow the pictures and don’t get them mixed up as connecting the kit backwards could destroy the kit

Calibration, Testing, and Connecting to other Circuits

We supply the kit with a red led for testing and calibration purposes...if all you need is to know where your train is at, you can mount this led at your control panel by using some long wires

Below is the Wiring Diagram for connecting your Red Status Indicator Led that is supplied with the kit
Apply 6-12 volts DC power to the power input wires on the kit as per the picture above

If the lights are fairly bright in your layout room the red led should light up when you cover either one of the two phototransistors with your finger.

If the red led does not light when you cover either one or both of the phototransistors, then while keeping at least one of the phototransistors covered, take a small screwdriver, and turn the calibration trimmer until the red led turns on...

start by turning the calibration trimmer a small ways to the right then cover either one or both of the phototransistors, again......by turning to either the left or right you should find a spot where the status led turns on when you cover one of the phototransistors....

if you still cant get it to work, try increasing the light in you layout room...maybe try a small clamp on lamp over one of the phototransistors...and try adjusting the calibration trimmer again...it should work....
Below is the wiring diagram for interfacing to our Crossing Flasher Kit

( The crossing flasher kit is not included but is for sale separately from the detector kit )

Below is the wiring diagram for interfacing to our Crossing Flasher Kit and the Red Status Indicator both at the same time.

Please make sure long legs of phototransistors are connected to red wires.

Please note that the diagram shows the connection points for interfacing the easydetect circuit and the crossing flasher to the crossing detector kit. Ensure all connections are secure and follow the diagram carefully to avoid any issues.

Please ensure the long legs of the phototransistors are properly connected to the red wires as indicated in the diagram.
please make sure long legs of phototransistors are connected to red wires
BELOW IS OUR WIRING DIAGRAM FOR INTERFACING OUR DETECTOR KITS TO A 12 VOLT DC RELAY

Pictured below is a wiring diagram for interfacing with a generic 12 volt DC relay. Things to bear in mind when interfacing to a relay:

1. Relay Selection: your relay must be a relay whose coil will operate reliably with 12 volts dc and 20 milliamps or less of power. 2. Your power supply for your load should not exceed the relay's contact rating.
Pictured below is a wiring diagram showing how to interface with the 12 volt relay we sell in our Detector with Relay Kit

Things to bear in mind when interfacing to a relay

3. Relay Selection: your relay must be a relay whose coil will operate reliably with 12 volts dc and 20 milliamps or less of power 4. Your power supply for you load should not exceed the relays contact rating

see the pictures below for proper placing of your phototransistors and extra lighting options if your layout room has dim lighting

CONGRATULATIONS - That's it ….you are done……

Troubleshooting
If the red led does not come on regardless of which way or how far you turn the calibration trimmer then check the following

1. are the phototransistors wired correctly so that the long leg of each phototransistor is connected to the correct wire that goes to the correct hole?

2. check to see that all your soldering connections are nice and strong

3. check to see that the 2n3904 transistor is installed facing the right direction

4. check to see that you have the positive and negative wires that power the kit are connected correctly to you 6 - 12 volt dc power source

5. MAKE SURE YOUR POWER SUPPLY IS DC NOT AC

6. check to see that your 6 - 12 volt power supply is turned on…you can check that by connecting the red led/ 560 ohm resistor combination directly to your 6 - 12 volt dc power supply…make sure the 560 ohm resistor is soldered to one leg of the led or it could blow up the led

7. check to see that the red led is wired correctly, if it is backwards, it wont hurt the kit, but it wont light up either

8. the detector will not work if you turn the lights off in your layout room or if the lights are not bright enough. One way around this would be to install light posts on your layout above the phototransistors…see diagram below

9. Remember that at least one of the phototransistors need to be covered for the detector circuit to be activated. If your train is too short, you could have a situation where the detector comes on when the engine covers the first phototransistor, but shuts off before the train reaches the crossing because the 1st phototransistor gets uncovered before the 2nd phototransistor gets covered
Thanks again for purchasing our new train detector kit. If you have any questions or problems please call us at 503-377-8247 or email sales@quickar.com.

see illustration below for proper spacing of your phototransistors and for wiring the phototransistors in our Deluxe 4 Point Detector kit.

easydetect © - deluxe detector with 4 phototransistor detection points.
approaching train detector not activated until 1st phototransistor is covered

1st phototransistor covered and detector circuit is activated
Both phototransistors covered
detector is still activated

Both phototransistors covered
detector is still activated

Train is leaving
one phototransistors is still covered
detector is still activated

Phototransistor 2

Phototransistor 1

Phototransistor 2

Phototransistor 1
As shown in the above pictures, Please note that as long as at least one of the phototransistors is covered the detector is still activated, so if the train stops and backs up, as long as at least one phototransistor is covered, the detector will work.

Things to remember before buying or installing your detector kit so your detector kit works properly

10. the detector will not work if you turn the lights off in your layout room or if the lights are not bright enough. One way around this would be to install light posts on your layout above the phototransistors...see diagram below
Things to remember before buying or installing your detector kit so your detector kit works properly

11. Remember that at least one of the phototransistors need to be covered for the detector circuit to be activated. If your train is too short, you could have a situation where the detector comes on when the engine covers the first phototransistor, but shuts off before the train reaches the crossing because the 1st phototransistor gets uncovered before the 2nd phototransistor gets covered. See picture below...The remedy is to either move the two phototransistors closer together, or use a longer train or you can purchase our Deluxe Detector Kit that features 2 extra phototransistors for a total of 4 detection points

See Wiring Diagram Below for wiring the
4 phototransistors in our Deluxe Detector Kit
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Revisions 10/30/2018
COMMON QUESTIONS
(and answers)

QUESTION: What does it take to power the detector kit(s)?
ANSWER: 12 volt DC power supply...one that is separate from your power to the train tracks.

QUESTION: How much power does the detector kit(s) output?
ANSWER: 12 VOLTS DC @ 20 MILLIAMPS

QUESTION: Can you use a deluxe (4 point) detector kit to cover a double crossing?
ANSWER: YES...2 detection points on either side of each crossing track.

QUESTION: Can I add more than 4 detection points?
ANSWER: NO....4 detection points is the maximum per detector kit.

QUESTION: What is the optional relay for?
ANSWER….So you can power any crossing signal or other device that needs more than 12 volts DC at more than 20 milliamps…….with the optional relay and a separate power supply…… you can use the detector kit to turn on and off ANY brand crossing flasher or other device….AC OR DC…and up to 10 amps

QUESTION: Do I need the relay?
ANSWER: Only if the device (crossing flasher or other) you are powering with the detector kit needs more than 20 milliamps at 12 Volts DC

QUESTION: I don’t have a crossing flasher yet…what should I get?
ANSWER: Our crossing flasher works perfectly with ANY of our detector kits…no relay needed

QUESTION: I still have other questions…what should I do?
ANSWER: Call us at 503-801-8408…10am to 6pm Mon-Fri Pacific Time

New circuit diagrams

DPDT RELAY
using external power for relay contacts
2 amps max

POSITIVE IN
from external power supply

OUTPUT

NEGATIVE IN
from external power supply
max 2 amps

OUTPUT WIRES
CHANGE POLARITY
FROM POSITIVE TO NEGATIVE
AS RELAY OPENS AND CLOSES

Positive IN from Detector out

Negative IN from Detector Out
Maximum 12vdc @ 20ma input and output

Positive power in

Positive power out of detector

Negative power out of detector

long leg of phototransistor to red wire

Phototransistor 1

Phototransistor 2

560 ohm 1/2 watt resistor

long leg of led

long leg of led

POSITIVE IN from external power supply

NEGATIVE IN from external power supply max 2 amps

OUTPUT WIRING CHANGE POLARITY FROM POSITIVE TO NEGATIVE AS RELAY OPENS AND CLOSERS ALLOWS YOU TO CHANGE THE COLOR OF YOUR LED SIGNALS OR CHANGE THE POSITIONS OF YOUR SWITCHES OR BOTH
WITH BIPOLAR LED

1st phototransistor is covered
the detector is activated

Phototransistor 2
Phototransistor 1

WITH THE DPDT RELAY
THIS WILL ACTIVATE THE CROSSING
AND LIGHT THE LED GREEN LED
AS THE TRAIN APPROACHES

Train is leaving
no phototransistors are covered
detector shuts off

Phototransistor 2
Phototransistor 1

WITH DPDT RELAY THE CROSSING
SHUTS OFF AND THE GREEN LED
TURNS RED
WITH BIPOLAR LEDS ON EITHER SIDE OF THE CROSSING

1st phototransistor is covered
the detector is activated

WITH THE DPDT RELAY
THIS WILL ACTIVATE THE CROSSING
AND LIGHT THE LED GREEN LED
AS THE TRAIN APPROACHES

Train is leaving
no phototransistors are covered
detector shuts off

WITH DPDT RELAY THE CROSSING
SHUTS OFF AND THE GREEN LED
TURNS RED